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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/000,284	11/15/2001	Dong Wu	.56530US002	9016
32692	7590	08/04/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			SHOSHO, CALLIE E	
			ART UNIT	PAPER NUMBER
			1714	

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/000,284

Applicant(s)

WU ET AL

Examiner

Callie E. Shosho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 and 44-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 and 44-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/20/05 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 36-42, 44-48, and 51 are rejected under 35 U.S.C. 102(e) as being anticipated by Fukuda (U.S. 6,740,152).

Fukuda discloses water-based ink jet ink comprising pigment, humectant, and 10-70% of combination of polymers comprising self-crosslinking polymer containing alkoxyisilyl groups as well as crosslinked polymer and non-crosslinking polymer. There is also disclosed method of printing the ink onto substrate (col.1, lines 10-16, col.3, lines 32-38, col.4, lines 1-5, and col.6,

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lines 7-9 and 30-42). Given that Fukuda discloses self-crosslinking polymer as presently claimed, it is clear that the polymer would inherently be shear deformable.

In light of the above, it is clear that Fukuda anticipates the present claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-2, 4, 6, 8-9, 15-27, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al. (U.S. 2003/0236321) in view of Krepski et al. (U.S. 5,929,160).

Sano et al. disclose water-based ink comprising pigment, thermosetting polyurethane, and additional dispersed acrylic polymer. There is also disclosed ink set comprising cyan, magenta, yellow, and black inks. There is further disclosed method of printing the ink onto substrate using ink jet printer (paragraphs 2, 4, 29, 33, 51-52, 58, 63, and 151).

The difference between Sano et al. and the present claimed invention is the requirement in the claims of (a) silyl-terminated sulfopoly(ester-urethane) polymer and (b) ink set comprising white ink.

With respect to difference (a), Krepski et al., which is drawn to coatings for paper, disclose the use of up to 70% silyl-terminated sulfopoly(ester-urethane) polymer of the formula:



which, when m is 0, is identical to that presently claimed when m is 1, n is 0, s is 0, R^D is alkylene group, X¹ is OC(O)NH, R² is alkylene group, X² is NHC(O)NH, R³ is alkylene group, and Y is Si(OR⁸)(R⁴) where R⁸ is H or lower alkyl and R⁴ is lower alkyl. The silyl-terminated

and Y is $\text{Si}(\text{OR}^8)(\text{R}^4)$ where R^8 is H or lower alkyl and R^4 is lower alkyl. The silyl-terminated sulfopoly(ester-urethane) polymer is used in order to impart toughness, weatherability, abrasion resistance, and enhanced adhesion to substrate (col.4, line 66-67 and col.5, lines 13-16). Given that Krepski et al. disclose silyl-terminated sulfopoly(ester-urethane) polymer identical to that presently claimed, it is clear that such polymer would intrinsically be shear deformable and not be substantially swelled by aqueous vehicle.

In light of the motivation for using silyl-terminated sulfopoly(ester-urethane) polymer disclosed by Krepski et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use silyl-terminated sulfopoly(ester-urethane) polymer in the ink of Sano et al. in order to produce ink with good toughness, weatherability, abrasion resistance, and enhanced adhesion, and thereby arrive at the claimed invention.

With respect to difference (b), Sano et al. disclose ink set comprising cyan, magenta, yellow, and black inks. However, there is no disclosure of ink set comprising five inks including white ink as presently claimed.

However, it would have been within the skill level of one of ordinary skill in the art to recognize that depending on the desired colors present in the final image, the end use of the ink, the color of the substrate, etc., additional inks of different colors including white would be utilized in order to produce the desired printed image, and thereby arrive at the claimed invention.

7. Claims 1-5, 9-16, 23-25, 27, 31, 34-39, 41-50, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu (U.S. 5,889,083) in view of Krepski et al. (U.S. 5,929,160).

Zhu discloses ink jet ink comprising aqueous medium, pigment or dye, humectant, 1-40% polyurethane, and if used, 1-5% organic solvent. The ink has viscosity of 1-10 cP. The ink is printed onto substrate such as paper, glass, and plastic. There is also disclosed a printing process wherein the above ink is jetted onto paper using ink jet printer to form printed article (col.2, line 66-col.3, line 1, col.3, lines 16-28, col.4, line 55, col.6, lines 29 and 33-35, col.9, line 7, and col.10, lines 52-63).

The difference between Zhu and the present claimed invention is the requirement in the claims of silyl-terminated sulfopoly(ester-urethane) polymer.

Krepeski et al., which is drawn to coatings for paper, disclose the use of silyl-terminated sulfopoly(ester-urethane) polymer of the formula:



which, when m is 0, is identical to that presently claimed when m is 1, n is 0, s is 0, R^D is alkylene group, X¹ is OC(O)NH, R² is alkylene group, X² is NHC(O)NH, R³ is alkylene group, and Y is Si(OR⁸)(R⁴) where R⁸ is H or lower alkyl and R⁴ is lower alkyl. The silyl-terminated sulfopoly(ester-urethane) polymer is used in order to impart toughness, weatherability, abrasion resistance, and enhanced adhesion to substrate (col.4, line 66-67 and col.5, lines 13-16). Given that Krepeski et al. disclose silyl-terminated sulfopoly(ester-urethane) polymer identical to that

presently claimed, it is clear that such polymer would intrinsically be shear deformable and not be substantially swelled by aqueous vehicle.

In light of the motivation for using silyl-terminated sulfopoly(ester-urethane) polymer disclosed by Krepski et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use silyl-terminated sulfopoly(ester-urethane) polymer in the ink of Zhu in order to produce ink with good toughness, weatherability, abrasion resistance, and enhanced adhesion, and thereby arrive at the claimed invention.

8. Claims 1-2, 4-9, 15-16, 23-25, 27-30, 32-37, 40-42, 44-49, and 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erdtmann et al. (U.S. 6,533,408) in view of Krepski et al. (U.S. 5,929,160).

Erdtmann et al. disclose ink jet ink comprising aqueous medium, pigment, humectant, and 0.1-10% polyurethane. The ink is printed onto substrate such as fabric, paper, plastic or film. There is also disclosed a printing process wherein the above ink is jetted onto paper using piezoelectric ink jet printer to form printed article (col.1, lines 16-20, col.2, lines 65-67, col.3, lines 10-19, col.4, line 19, col.5, lines 1-3, col.5, line 67-col.6, line 1, col.8, lines 51-53, col.9, lines 27-44, and col.15, lines 28-30).

The difference between Erdtmann et al. and the present claimed invention is the requirement in the claims of silyl-terminated sulfopoly(ester-urethane) polymer.

Krepski et al., which is drawn to coatings for paper, disclose the use of silyl-terminated sulfopoly(ester-urethane) polymer of the formula:



which, when m is 0, is identical to that presently claimed when m is 1, n is 0, s is 0, R^D is alkylene group, X¹ is OC(O)NH, R² is alkylene group, X² is NHC(O)NH, R³ is alkylene group, and Y is Si(OR⁸)(R⁴) where R⁸ is H or lower alkyl and R⁴ is lower alkyl. The silyl-terminated sulfopoly(ester-urethane) polymer is used in order to impart toughness, weatherability, abrasion resistance, and enhanced adhesion to substrate (col.4, line 66-67 and col.5, lines 13-16). Given that Krepski et al. disclose silyl-terminated sulfopoly(ester-urethane) polymer identical to that presently claimed, it is clear that such polymer would intrinsically be shear deformable and not be substantially swelled by aqueous vehicle.

In light of the motivation for using silyl-terminated sulfopoly(ester-urethane) polymer disclosed by Krepski et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use silyl-terminated sulfopoly(ester-urethane) polymer in the ink of Erdtmann et al. in order to produce ink with good toughness, weatherability, abrasion resistance, and enhanced adhesion, and thereby arrive at the claimed invention.

Response to Arguments

9. Applicants' arguments regarding Kubota et al. (U.S. 5,846,306) have been fully considered but they are moot in view of the discontinuation of the use of this reference against the present claims.

10. Applicants' arguments filed 5/20/05 have been fully considered but, with the exception of arguments relating to Kubota et al., they are not persuasive.

Specifically, applicants argue that Zhu is not a relevant reference against the present claims given that Zhu discloses polymer different than polymer presently claimed.

Specifically, applicants argue that the polyurethane of Zhu is a binder that is a film former and is compatible with wax while the polymer of the present invention does not require drying to a film, does not have a glass transition temperature, and is not compatible with waxes.

However, while there is no requirement in the present claims that the polymer forms a film by drying, there is nothing in the scope of the present claims which excludes the polymer from doing so. Further, there is nothing in the scope of the present claims that requires that the polymer form film using crosslinking. Further, applicants argue that the polymer of the present invention has no glass transition temperature given that thermoset polymers do not have glass transition temperatures. However, as evidenced by Hoey (U.S. 3,891,487) and Miyake et al. (U.S. 6,680,089), it appears that thermoset polymers can possess glass transition temperature (Hoey – col.13, lines 27-29 and Miyake et al. – col.28, line 19), and thus applicants' arguments are not understood. Clarification is requested. Further, while applicant argue that polymer of present invention is not compatible with waxes, applicants have offered no evidence to support this position.

Applicants also argue that Erdtmann et al. is not a relevant reference against the present claims given that Erdtmann et al. disclose polymer different than polymer presently claimed.

Specifically, applicants argue that Erdtmann et al. must be teaching the use of thermoplastic polymers given thermoset polymers such as those presently claimed do not have glass transition temperature. Further, applicants argue that the polymer of Erdtmann et al. has high pH stability characteristics while the self-crosslinking polymer of the present claims does not.

However, as described above, in light of the evidence found in Hoey and Miyake et al., thermoset polymers do appear to possess glass transition temperature. Further, while applicants argue that the polymer of the present invention is not stable under high pH characteristics, which is direct contrast to the polymer of Erdtmann et al. which discloses polymer that has high pH stability characteristics, applicants have provided no evidence to support this position. It is noted that “the arguments of counsel cannot take the place of evidence in the record”, *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965).

In response to examiner’s argument that Krepski et al. is a relevant reference against the present claims given that Krepski et al. disclose the use of silyl-terminated sulfopoly(ester-urethane) polymer in coating for paper which is similar to ink, applicants argue that coatings for paper and inks are very different from each other. Applicants also argue there is no motivation to combine Zhu with Krepski et al. given that there is no disclosure in Krepski et al. that the silyl-terminated sulfopoly(ester-urethane) is utilized in inks as presently claimed.

However, applicants’ are reminded that according to MPEP 2141.01 (a), a reference may be relied on as a basis for rejection of an applicants’ invention if it is “reasonably pertinent to the particular problem with which the inventor is concerned.” A reasonably pertinent reference is

further described as one which “even though it maybe in a different field of endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor’s attention in considering his problem.” Krepski et al., therefore, is a reasonably pertinent reference, because it teaches that silyl-terminated sulfopoly(ester-urethane) polymer imparts toughness, weatherability, abrasion resistance, and enhanced adhesion, which are functions especially pertinent to the invention at hand.

In response to examiner’s argument that Krepski et al. disclose using sulfopoly(ester-urethane) in aqueous compositions comprising pigment, dispersant, defoamer, etc. which are very similar to the ingredients found in inks, applicants argue that to say that the ingredients are similar is to ignore the complexity of the technical issues that the experimenter must face when designing formulations for inks or coatings. As evidence to support this position, applicants cite several articles that describe the complexity/difficulties of producing inks and coatings for paper.

However, firstly, it is noted that Krepski et al. is not used for a teaching of ink jet ink. This is already disclosed by Zhu or Erdtmann et al. While it is agreed that the inks are not identical to paper coatings, it is the examiner’s position that given the similarities between ink and coatings in terms of substrates on which they are used and ingredients that are present, Krepski et al. is a reasonably pertinent reference.

It is noted that Zhu discloses using polymer as binder to provide abrasion resistance and adhesion and Erdtmann et al. disclose using polymer to provide improved abrasion resistance. However, there is no disclosure of silyl-terminated sulfopoly(ester-urethane) polymer. This is why each reference is used in combination with Krepski et al. which discloses using silyl-

terminated sulfopoly(ester-urethane) polymer to impart toughness, weatherability, abrasion resistance, and enhanced adhesion. That is, not only does the silyl-terminated sulfopoly(ester-urethane) polymer of Krepski et al. '160 impart the advantages exhibited by the polymers disclosed by Zhu or Erdtmann et al., but additional advantages, and thus, there is motivation to use the silyl-terminated sulfopoly(ester-urethane) polymer as the polymer in the ink of Zhu or Erdtmann et al.

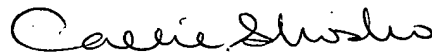
In light of the above, it is the examiner's position that Zhu, Erdtmann et al., and Krepski et al. remain relevant references against the present claims.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie E. Shosho whose telephone number is 571-272-1123. The examiner can normally be reached on Monday-Friday (6:30-4:00) Alternate Fridays Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Callie E. Shosho
Primary Examiner
Art Unit 1714

CS
7/29/05